Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 – 15 (canceled)

Claim 16 (new) A method of polymerizing aminoacid-N-carboxyanhydride monomers having a ring with a O-C_5 and a O-C_2 anhydride bond comprising:

(a) combining a first NCA monomer with an initiator molecule complex comprised of:

(i) a low valent metal capable of undergoing an oxidative addition reaction wherein the oxidative addition reaction formally increases the oxidation state by two electrons; and

(ii) an electron donor comprising a Lewis base;

(b) allowing the initiator molecule to:

(i) open the ring of the first NCA through oxidative addition across either the O-C_5 or O-C_2 anhydride bond;

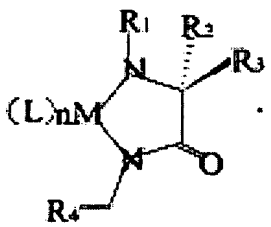
(ii) combine with a second NCA monomer, to form an amido-containing metallacycle; and

(c) allowing a third NCA monomer to combine with the amido containing metallacyle so that:

(i) the amido nitrogen of the amido containing metallacyle attacks the carbonyl carbon of the NCA and the NCA is added to the polyaminoacid chain; and

(ii) the amido containing metallacyle is regenerated.

Claim 17 (new) The method of claim 16 wherein the amido containing metallacyle is of the general formula:



wherein M is the low valent transition metal;

L is the Lewis Base ligand;

R1, R2 and R3 comprises a side chain of an amino acid selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine; and

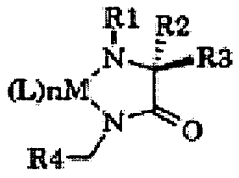
R4 is the polyaminoacid chain.

Claim 18 (new) The method of claim 16 wherein the efficiency of the initiator is controlled by allowing the reaction to proceed in a solvent selected for its ability to influence the reaction.

Claim 19 (new) The method of claim 17 wherein the solvent is selected from the group consisting of ethyl acetate, toluene, dioxane, acetonitrile, THF and DMF.

Claim 20 (new) The method of claim 16, wherein the α-aminoacid-N-carboxyanhydride monomer is selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine.

Claim 21 (new) A five membered amido-containing metallacycle comprising a molecule of the general formula:



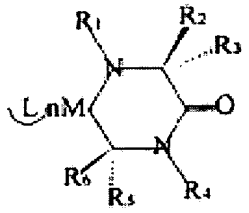
wherein M is a low valent transition metal;

L is a Lewis Base ligand;

R1, R2 and R3 comprises a side chain of an amino acid selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine; and

R4 is a hydrogen moiety or a polyaminoacid chain.

Claim 22 (new) A six membered amido-containing metallacycle comprising a molecule of the general formula:



wherein M is a low valent transition metal;

L is a Lewis Base ligand;

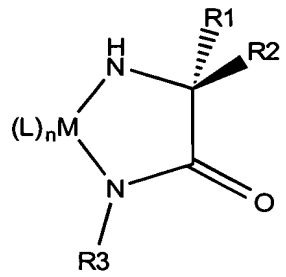
R1, R2, R3, R5 and R6 is a side chain of an amino acid selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine; and

R4 is a polyaminoacid chain.

Claim 23 (new) The composition of claim 21 wherein the metal is a transition metal selected from the group consisting of nickel, palladium, platinum, cobalt, rhodium, iridium and iron.

Claim 24 (new) The composition of claim 21 wherein the Lewis Base ligand is selected from the group consisting of pyridyl ligands, diimine ligands, bisoxazoline ligands, alkyl phosphine ligands, aryl phosphine ligands, tertiary amine ligands, isocyanide ligands and cyanide ligands.

Claim 25 (new) A five membered amido-containing metallacycle comprising a molecule of the general formula:



wherein M is a low valent transition metal;

L is a Lewis Base ligand;

one of R1 and R2 is an amino acid side group and the other is hydrogen; and R3 is any functional end group capable of being attached to a primary amine group.

Claim 26 (new) The amido-containing metallacycle of claim 25, wherein R1 or R2 comprises a side chain of an amino acid selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine.

Claim 27 (new) The amido-containing metallacycle of claim 25, wherein R1 or R2 comprises a side chain of an amino acid selected from the group consisting of oligo(ethyleneglycol) functionalized (EG-)cysteine, EG-lysine, EG-serine, and EG-tyrosine.

Claim 28 (new) The amido-containing metallacycle of claim 25, wherein R3 is a peptide, oligosaccharide, oligonucleotide, fluorescent molecule, polymer chain, small molecule therapeutic, or chemical linker that couples the polypeptide to another molecule.

Claim 29 (new) A method of making an amphiphilic block copolypeptide, comprising the steps of: (1) generating a soluble block polypeptide by combining an amount of an oligo (ethyleneglycol) functionalized aminoacid-N-carboxyanhydride (EG-aa-NCA) monomer with an initiator molecule; and (2) attaching an insoluble block by combining the soluble block with a composition comprising at least one other amino acid NCA monomer.

Claim 30 (new) The method of claim 29, wherein the amino acid component of the EG-aa-NCA monomer is lysine, serine, cysteine, or tyrosine.

Claim 31 (new) The method of 29 wherein the insoluble block contains a mixture of amino acids.

Claim 32 (new) A method of adding an aminoacid-N-carboxyanhydride (NCA) monomer to a soluble block polypeptide, comprising combining the NCA monomer with the soluble block polypeptide, said soluble block having one or more oligo(ethyleneglycol)-functionalized amino acid residues, so that the NCA monomer is added to the polypeptide.

Claim 33 (new) A polypeptide composition comprising a block copolypeptide having:

(a) a total number of overall monomer units that is greater than about 100 amino acid residues; and

(b) a distribution of chain-lengths of at least about $1.01 < Mw/Mn < 1.25$.

Claim 34 (new) The block copolypeptide of claim 33, wherein said polypeptide has a number of overall monomer units that are greater than about 250 amino acid residues.

Claim 35 (new) The block copolypeptide of claim 33, wherein said polypeptide comprises a least 3 blocks of consecutive identical amino acid monomer units.

Claim 36 (new) The block copolypeptide of claim 33, wherein at least one of the blocks is components γ-benzyl-L-glutamate.

Claim 37 (new) The block copolypeptide of claim 33, wherein at least one of the blocks is components ϵ-carbobenzyloxy-L-lysine.

Claim 38 (new) The block copolypeptide of claim 33, wherein said polypeptide is composed of amino acid components γ-benzyl-L-glutamate and ϵ-carbobenzyloxy-L-lysine.

Claim 39 (new) The block copolypeptide of claim 33, wherein said polypeptide is selected from the group consisting of a poly(ϵ-benzyloxycarbonyl-L-Lysine-*block*-γ-benzyl-L-glutamate), PZLL-b-PBLG, diblock copolymer and a poly(γ-benzyl-L-glutamate-*block*-ϵ-benzyloxycarbonyl-L-Lysine-*block*-γ-benzyl-L-glutamate) triblock copolymer.

Claim 40 (new) An amphiphilic block copolypeptide comprising a soluble block polypeptide having one or more oligo(ethyleneglycol)-conjugated amino acid

residues and an insoluble block comprised substantially of nonionic amino acid residues.

Claim 41 (new) An amphiphilic block copolypeptide comprising: (1) a soluble block polypeptide having EG-lysine residues, and (2) an insoluble block polypeptide containing a mixture of two to three different kinds of amino acid components in a statistically random sequence.

Claim 42 (new) An amphiphilic block copolypeptide consisting of at least 3 blocks, wherein one or more of the blocks is a soluble block polypeptide and another block is an insoluble block polypeptide.

Claim 43 (new) An amphiphilic block copolypeptide comprising a soluble block polypeptide and and an insoluble block polypeptide, said soluble block having at least about 30% mole percent identical amino acid residues having charged or oligo(ehtyleneglycol)-conjugated side chains and said insoluble block comprising at about 60 to 100 mole percent nonionic amino acid residues.

Claim 44 (new) The amphiphilic block copolypeptide of claim 43 wherein the insoluble block comprises about 3 to about 60 mole percent of the total copolypeptide.

Claim 45 (new) The amphiphilic block copolypeptide of claim 43 wherein the nonionic amino acid residues are selected from the group consisting of phenylalanine, leucine, valine, isoleucine, alanine and methionine.

Claim 46 (new) The amphiphilic block copolypeptide of claim 43 wherein the amino acid residues having charged side chains are selected from the group consisting of glutamic acid, aspartic acid, arginine, histidine, lysine, and ornithine.

Claim 47 (new) The amphiphilic block copolypeptide of claim 43 wherein the amino acid residues having oligo(ehtyleneglycol)-conjugated side chains are selected from the group consisting of EG-cysteine, EG-lysine, EG-serine, and EG-tyrosine.

Claim 48 (new) A chain-end functionalized block polypeptide having ten or more consecutive identical amino acid residues and an endgroup selected from the group consisting of an oligosaccharide, oligonucleotide, fluoresent molecule, polymer chain, small molecule therapeutic, or reactive chemical linker to attach the block copolypeptide to another molecule.

Claim 49 (new) A chain-end functionalized block copolypeptide having an end group selected from the group consisting of a napthyl group, an alkyl group, an allyl group, and cysteinamide.

Claim 50 (new) A polyaminoacid chain comprising at least ten consecutive oligo(ethyleneglycol)-conjugated amino acid resdues.

Claim 51 (new) A method of forming vesicles comprising the step of suspending the amphiphilic block copolypeptides of claim 40 an aqueous solution so that the copolypeptides spontaneously self assemble into vesicles.

Claim 52 (new) The method of claim 51, further comprising the step sonicating the suspended vesicles to form smaller vesicles having a diameter of about 50 nm to about 500 nm.

Claim 53 (new) Vesicle-containing compositions comprising the amphiphilic block copolypeptides of Claim 40 and water.

Claim 54 (new) A method for making EG-functionalized amino acid monomers, comprising the step of combining an ethyleneglycol (EG) derivative with an amino acid having a reactive side group.

Claim 55 (new) The method of claim 54, whereing the EG derivative has the general formula $(CH_3OCH_2CH_2)_nX$; wherein n is about 1 to 3, and X is a reactive group selected from the group consisting of chloroformate, N-hydroxysuccidimydyl acetate, and halide.

Claim 56 (new) The method of claim 54, wherein the amino acid is selected from the group consisting of lysine, serine, cysteine, and tyrosine.

Claim 57 (new) The method of claim 54, further comprising the step of converting the EG functionalized amino acid to an NCA monomers.

Claim 58 (new) A method of making a soluble block polypeptide comprising the step of combining an amount of an EG functionalized aminoacid-N-carboxyanhydride (NCA) monomer with an initiator molecule comprising a low valent transition metal-Lewis Base ligand complex so that a EG functionalized polyaminoacid chain is generated.

Claim 59 (new) The method of claim 58 wherein the low valent transition metal is selected from the group consisting of nickel, palladium, platinum, cobalt, rhodium, iridium and iron.

Claim 60 (new) The method of claim 58 wherein the Lewis Base ligand is selected from the group consisting of pyridyl ligands, diimine ligands, bisoxazoline ligands, alkyl phosphine ligands, aryl phosphine ligands, tertiary amine ligands, isocyanide ligands and cyanide ligands.

Claim 61 (new) The method of claim 58 wherein the EG functionalized-aminoacid-N-carboxyanhydride monomer is selected from the group consisting of EG-cysteine, EG-lysine, EG-serine, and EG-tyrosine.

Claim 62 (new) A method of preparing a polypeptide having a defined end group comprising the steps of:

a) combining an alloc-amino acid amide with an initiator comprising a low valent transition metal-Lewis Base ligand complex for a time and under conditions effective to form an amido-amidate metallacycle; and

b) adding one or more amino acid-N-carboxyanhydride monomers to the metallacycle for a time and under conditions effective to form a polypeptide having an end group derived from the alloc-amino acid amide.